~~CONFIDENTIAL~~

135

RESEARCH AID

UNIT-COST INDEX FOR CAPITAL INVESTMENT IN THE USSR 1925-54

CIA/RR RA-2
18 November 1955

CENTRAL INTELLIGENCE AGENCY

OFFICE OF RESEARCH AND REPORTS

~~CONFIDENTIAL~~

WARNING

This material contains information affecting the National Defense of the United States within the meaning of the espionage laws, Title 18, USC, Secs. 793 and 794, the transmission or revelation of which in any manner to an unauthorized person is prohibited by law.

Approved For Release 1999/09/27 : CIA-RDP79S01046A000400030001-4

RESEARCH AID

UNIT-COST INDEX FOR CAPITAL INVESTMENT IN THE USSR 1925-54

CIA/RR RA-2

(ORR Project 10.714)

CENTRAL INTELLIGENCE AGENCY

Office of Research and Reports

C O N F I D E N T I A L

Approved For Release 1999/09/27 : CIA-RDP79S01046A000400030001-4

FOREWORD

This research aid was prepared as an integral part of ORR Project 10.409, Capital Investment in the USSR, SECRET. It is published separately in response to generally expressed interest in a unit-cost index for capital investment, such an index being of use in problems requiring capital investment to be expressed in constant-cost terms. Those who are primarily interested in the deflated series for capital investment, which is the final product derived from the use of the unit-cost index, are directed to ORR Project 10.409.

Unit-cost indexes have been computed for total state capital investment and for industrial capital investment as well as for spot years covering state agricultural investment and kolkhoz investment.

Because of the complexity of the methods used in deriving the indexes, a detailed methodology forms the bulk of this research aid. The methodology is technical in treatment because it is primarily directed at two classes of readers: (1) those who wish to establish the relevancy of the indexes to their own particular analytical problems and (2) those who may wish to conduct additional research, such as research directed to reducing the range of error for the prewar period.

Since the inclusiveness of Soviet announcements concerning capital investment varies from one time period to another,* the unit-cost indexes are derived from data of varying completeness. In the case of the unit-cost index for total state capital investment, the basic data used in its derivation generally amounted to at least two-thirds of total capital investment defined in its most comprehensive sense. Accordingly, this index may be considered as having been derived from a very large sampling of gross capital investment. It may be applied to capital investment data defined more inclusively than the data used in the derivation of the index if it seems unlikely that cost movements in the additional investment categories were substantially different. Where there is no information permitting this judgment one way or the other, the unit-cost index becomes the "best estimate" for application to the gross investment figure.

* For example, before 1938, capital repair was considered part of capital investment. After 1938 it was excluded from the usual definition of capital investment.

In essence, these indexes are derived from Soviet data and confirmed by Soviet data. They appear to represent fairly the official Soviet view of the cost movements throughout this period. To the extent that the Soviet data are subject to bias or systematic error, these indexes are subject to the same distortion.

Confidence in the derived unit-cost indexes would be higher if it were possible to compare them with additional specific indexes of producer goods prices, construction costs, and other indexes of related interest which are now being compiled in intelligence reports and academic studies. Until extensive comparison can be effected, this study is published as a research aid. Preliminary comparisons indicate good reliability for the postwar indexes and lesser reliability for the prewar series. The indexes are published to make them available as a basis for additional research and to make them available for use in problems requiring application of a unit-cost index.

CONTENTS

Appendixes

Tables

CIA/RR RA-2
(ORR Project 10.714)

C-O-N-F-I-D-E-N-T-I-A-L

UNIT-COST INDEX FOR CAPITAL INVESTMENT IN THE USSR*
1925-54

Summary

The unit-cost index for capital investment is an analytical tool used in research problems requiring capital investment to be expressed in constant value terms. It is a tool for eliminating cost-level fluctuations in problems where such fluctuations are an unwanted variable. Variations in cost levels have been of significant scale in recent Soviet economic history. For capital investment costs there has been a gradual long-term trend of increasing costs. There have been three plateaus of relatively stable investment costs, each plateau at a higher cost level: 1925 through 1930, 1937 through 1948, and 1951 through 1954. These plateaus have been separated by two periods of sharp inflation subsequently followed by deflation and return to comparative cost stability: 1931 through 1936 (with cost peaks in 1932, 1934, and 1936) and 1949 through 1950.

The unit-cost indexes of this research aid are meant to be applied to capital investment data net of subsidies -- that is, to the data of the official announcements.

Two levels of subsidization are distinguishable, both reducing the aggregate level of the official investment plan. The first is the "direct subsidy" paid directly to construction organizations, reimbursing them for actual outlay. Such direct subsidy must be drawn from a budget title other than capital investment to reduce the size of expenditures attributed to capital investment. This level of subsidy is no longer used in significant scale. The second and more common type of subsidy is the "indirect subsidy" (as affecting capital investment) -- that is, a subsidy to the manufacturer reducing the price paid by construction organizations for equipment or materials. Until 1949, prices of producer goods reflected extensive subsidization; substantial elimination of these subsidies in that year resulted

* The estimates and conclusions contained in this research aid represent the best judgment of ORR as of 1 June 1955.

in a sharp rise in the announced costs of capital construction. The unit-cost indexes, by virtue of their derivation from data net of subsidies, do not apply to investment data adjusted to include additional amounts representing subsidies.

The derived unit-cost index cannot directly adjust for changes in the quality of construction (except to the extent that such changes are reflected in the Soviet volume of capital investment series). A leading example of this occurred during World War II, when officially announced investment cost levels remained relatively constant but the quality of construction was sharply reduced.* In this respect, the unit-cost index may be used to determine the immediate volume of additions to plant and equipment but is not a measure of the quality of the additions.

I. Definition of Unit-Cost Index for Capital Investment.

Since general Soviet practice is to publish data on capital investments in prices of the current year,** certain types of investment analysis require a unit-cost index for capital investment by means of which the current costs of the particular year may be converted to a constant-cost basis expressed in terms of a base year.

The unit-cost index for capital investment expresses the investment costs of a particular year for a given volume of investment (theoretically, a constant "unit") in relation to the base-year costs. Algebraically, it may be expressed as follows:

$$I = \frac{P''}{P'}$$

In this equation, I equals the unit-cost index, P' equals the base-year costs per unit of investment, and P" equals the current costs per unit of investment.

* This is a very subtle form of hidden and deferred inflation, eventually reflected in increased repair expenditures and shortened service life.

** There are significant exceptions to this statement (see p. 7, below).

The three most important cost elements of capital investment outlays are labor, construction materials, and equipment. Increasing mechanization of construction has tended to reduce the volume of labor required -- that is, it has increased the productivity of labor rather sharply. In the course of time, innovations in procedures have tended to increase efficiency of the use of resources and have reduced overhead. Shifts in the efficiency of the use of resources and substitution of resources (such as substitution of increasingly cheaper equipment, in relative terms, for labor) are implicitly reflected in the unit-cost index.

II. General Commentary.

Table 1* gives the indexes of unit-cost for the following categories: (a) total state capital investment, (b) industrial capital investment, ar (c) state agricultural investment (excluding livestock and poultry). The latter two indexes are for selected years only -- 1937, 1945, 1949, and for 1950 (January and July levels). For most years the indexes for total investment and industrial investment have been subjected to consistency checks with data from other Soviet sources, most significant of which has been the constant-cost investment data given in Politicheskaya ekonomiya. 1/** For these two indexes this independent check shows a maximum range of error over an individual 5-year plan or over the entire range of years for which the check could be made amounting to less than plus or minus 10 percent.*** Because of peculiarities of methodology and of the check, the unit-cost index for an individual prewar year may be subject in the rare case to a higher range of error, arbitrarily plus or minus 20 percent.

For capital investment in general, the unit-cost index indicates a long-term trend toward gradual increase in costs, broken by two periods of sharp fluctuations in costs. There have been three plateaus characterized by comparative cost stability, each plateau at a higher level than its predecessor: 1925 through 1930, 1937 through 1948 (at an artificially low level), and 1951 through 1954. The fluctuation

* Table 1 follows on p. 4.

** For serially numbered source references, see Appendix B.

*** Both agricultural indexes were derived from authoritative sources, but because of weighting problems and the absence of consistency checks, they have been assigned an arbitrary range of error of plus or minus 15 percent.

Table 1

Unit-Cost Indexes for Capital Investment in the USSR
1925-37, 1940, and 1945-54

1945 = 100

Year	Total State Capital Investment		Industrial Capital Investment		State Agricultural Investment [a]		Kolkhoz Investment [a]	
	Index	Range of Error (Percent)	Index	Range of Error (Percent)	Index	Range of Error (Percent)	Index	Range of Error (Percent)
1925	72	±10	58	±10				
1926	79	±10	65	±10				
1927	77	±10	63	±10				
1928	75	±10	60	±10				
1929	72	±10	57	±10				
1930	72	±10 ±1 for total	57	±10 ±7 for total				
1931	87	±10 for 4 years	79	±10 for 4 years				
1932	107	±10	99	±10				
1933	100	±10	83	±10				
1934	118	±10 ±5 for total	113	±10 ±3 for total				
1935	93	±10 for 5 years	98	±10 for 5 years				
1936	114	±10	113	±10				
1937	84	±10	83	±10	98	±15	90	±15
1940	95	±10	95	±10				
1945	100	± 5	100	±10	100	±15	100	±15
1946	102	± 5	102	±10				
1947	107	± 5	107	±10				
1948	113	± 5	113	±10				
1949	151	± 5 ±3 for total	151	±10	131	±15	144	±15
1950 (January)	127	± 5 for 8 years	127	±10	92	±15	119	±15
1950 (July)	120	± 5	120	±10	88	±15	112	±15
1951	120 [b] (117) [c]	± 5	120 [b] (117) [c]	±10				
1952	120 [b] (110) [c]	± 5	120 [b] (110) [c]	±10				
1953	120 [b] (111) [c]	± 5	120 [b] (111) [c]	±10				
1954	120 [b] (109) [c]	± 5	120 [b] (109) [c]	±10				

a. Excluding livestock and poultry.
b. Nominal index for use with annual investment plans and fulfillment announcements. For sources and derivation, see Appendix A, Methodology.
c. Figures in parentheses are an approximation of the actual cost movement during this period.

Approved For Release 1999/09/27 : CIA-RDP79S01046A000400030001-4

periods were 1931 through 1936 and 1949 through 1950. Generally speaking, 1931 through 1934 was a period of rapid cost increase, interrupted by a price reduction in 1935, which was followed by the cost increases in 1936 accompanying the introduction of khozraschet (economic accountability),* finally culminated by cost declines in 1937 which somewhat reflected a new structure of subsidies.

For 1925-34, costs of industrial investment showed fluctuations similar to those of the total series but at a lower cost level relative to the base year. By 1934, industrial investment had become sufficiently large relative to total investment, so that the two index series became strongly parallel in movement and level, continuing to be so to the present.

In the postwar period the agricultural sector (exclusive of kolkhoz investment) has been strongly affected by the equipment requirements of the state farms and the Machine Tractor Stations; hence the index series strongly reflects the movements of equipment prices. This index increases in 1949 less than does the index of total investment and drops in 1950 to cost levels lower than those prevailing in 1945. On the other hand, kolkhoz investment is inflated by rising costs of labor and construction materials and parallels the total series for capital investment rather closely.

Various significant official statements may be applied as further checks on the prewar indexes for total capital investment and for industrial capital investment. These statements generally confirm the movements of the indexes. Where they disagree with the scale of the movement, the disagreement is not significant, falling within the range of error for the estimates by individual year.

Costs show a sizable increase between 1928 and 1932. The index for total state capital investment shows a jump of 43 percent; the corresponding index for industrial investment increases 65 percent. Inflation of this general scale is confirmed by a Soviet journal which states that capital investment in heavy industry in 1932 amounted to 8.4 billion rubles, which corresponded to approximately 6 billion "Planning Rubles." 2/ Assuming that the Planning Rubles represented

* Khozraschet is the economic responsibility of the enterprise to function as profitably as possible without dependence on subsidies from the state budget. Introduction of khozraschet necessitated many price increases when state subsidies were decreased or withdrawn.

the cost level of 1927/28, this amounts to an inflation of 40 percent in an investment sector which in the First Five Year Plan (1928-32) contained 86 percent of industrial investment and 42 percent of total investment. In the absence of the detailed cost handbooks which came into use in 1937 for the computation of constant investment costs, this Soviet estimate of the degree of inflation in 1932 is itself only an approximation.

A significant decline in costs in 1935 was projected by the plan for that year and probably occurred at least to the extent that prices were reduced in that year. 3/ The plan projected the reduction of the cost of pure construction by 12 percent and of equipment prices by 4 percent, resulting in an aggregate cost reduction of 10 percent. The indexes derived in this research aid may exaggerate this cost decline somewhat, but they correctly show a significant decline. The possible distortion falls within the range of error and is not significant.

In cases where quantitative evidence is lacking, qualitative information confirms the movement of the indexes. Thus the cost increase in 1936, as a result of a sizable reduction in state subsidies, is acknowledged by Bergson. 4/

The crucial problem throughout the prewar period, especially for 1930-37, is not only to register the cost movements throughout the period but also to assign the proper size or scale to the movements. This research aid has developed a method to achieve both of these goals, within a definable margin of error and yielding results consistent with announced constant-value totals for the first two Five Year Plans.*

III. Role and Significance of Estimate Costs.

In general, in the preparation of the Five Year Plans it has been the practice to prepare capital investment plans on the basis of the cost levels prevailing in the year preceding the plan or of the level established for the first year of the plan. The annual plans, however, continued to be established in the cost level of the particular year.

* See Table 12, p. 27, below.

By the Third Five Year Plan (1938-42) the plan costs became formalized as the "estimate cost" basis of the plan* and were used as a control upon the degree of fulfillment of the plan. Detailed price lists, transportation tariff schedules, and wage books were published to provide the requisite constant-price data used in the computation of the estimate costs. Completed investment was evaluated in terms of both the actual current costs and the estimate costs (constant-value) of the plan. Published data, however, were usually given in terms of the current costs. Unfortunately, during this period many Soviet statements either failed to specify the cost-basis of the data given or in many cases apparently identified it incorrectly, even contradicting other Soviet sources. Understandably, this has led to confusion in the interpretation of capital investment data, especially for 1938-40, but fortunately price movements throughout this period were so slight that no great error would be caused by the confusion.

In the Fourth Five Year Plan (1946-50) the annual investment plans were announced in terms of projected current costs. Fulfillment of the plan was given on a constant-cost basis in terms of percentage increases over the actual investment of the preceding year. The constant-cost basis for the fulfillment reports was composed of the "estimate costs" of the Fourth Five Year Plan.**

In the Fifth Five Year Plan (1951-55) there appears to have been a change of bookkeeping practice which led to the announcement of the annual investment plans in terms of the constant-cost (estimate cost) basis of the plan.*** Fulfillment likewise was given in this constant-cost basis. Comparison between announced investment plans and announced fulfillment has been handicapped by the fact that the investment plan includes an extraneous category, that of additions to the working capital of construction organizations.

---

* The estimate costs of the Third Five Year Plan were as follows: for construction-assembly work, the prices and norms operative on 1 December 1936; for equipment, the prices of the 1937 price lists. 5/

** By resolution of the Council of Ministers on 13 December 1946 (date as given), the estimate costs of the Fourth Five Year Plan were the relevant norms, wages, equipment prices, and transportation tariffs effective 31 December 1945. 6/

*** The estimate costs of the Fifth Five Year Plan were the relevant norms, wages, prices, and tariffs effective 1 July 1950. 7/

Thus, as indicated above, in certain instances, investment data have been released by the USSR on a constant-cost basis. For some periods, data exist on both current-cost and constant-cost bases; this consideration has been important in the derivation of the post-war indexes.

APPENDIX A

METHODOLOGY

1. Summary.

The unit-cost indexes for state capital investment and industrial capital investment have been derived by complex methodologies briefly summarized as follows:

a. 1924/25-1929/30.

Both indexes are based upon official indexes of producer goods prices and construction-cost indexes. Error probably is minimal.

b. 1930-37.

In the absence of official published indexes for these periods, both indexes are derived from comparison of annual investment in current costs to additions to capital stock in constant 1933 rubles. Tests indicate that the cumulative error is not significant -- that is, less than 10 percent in this case -- although the error for an individual year may be 10 percent and in rare cases possibly more.

c. 1945-49.

For total state capital investment, an implicit index is derived from generally comparable data given in both current and constant costs.* Error is indicated as being slight. Since a close correlation existed between the indexes of total state capital investment and industrial investment after 1934, the index for total investment is used as the best estimate for the industrial investment unit-cost index.

d. Links between 1937 and 1945 (Indexes for 1949-54).

Officially published data give the cost relationships between the 1937 cost level and the levels of 1945 and 1949 and of 1950 (both

* The two series utilized are those for (1) capital investment expenditures in current rubles and (2) the volume of capital investment, given in constant rubles.

the January and the July cost changes). The figures are broken down by ministry; therefore, weighted aggregates have been derived for sectors and for total investment. This information is reliable and does not contribute significantly to error. Since 1950, both annual planned investment and fulfillment of investment have been announced in terms of constant July 1950 prices. Accordingly, the July 1950 index has been extended through 1954.

The final indexes have been applied to the investment data, and the deflated results have been compared with the constant-cost investment totals by Five Year Plan as given in Politicheskaya ekonomiya, 1954 edition. The results indicate high comparability. By the same means, ranges of error have been established. Significantly, error does not compound throughout the series -- that is, the range of error for the years of the First Five Year Plan (1928-32) does not magnify to a larger error in the Fifth Five Year Plan (1951-55).

2. Unit-Cost Index for Total State Capital Investment.

a. Prewar Index.

(1) During the prewar period, Soviet statistics permit determination of an internally consistent series for the value of capital stock, in 1933 rubles. For the same period, annual capital investments have been announced, in current rubles. In 1933, when both sets of data are in comparable rubles, the addition to capital stock is 72.53 percent of total investment.

(2) In any given year the ratio of the addition to capital stock (in constant rubles) to annual investment (in current rubles) will be affected by two variables: (a) change in the real ratio of the two quantities and (b) change in unit-costs. The addition to capital stock will be designated as Δ and annual investment as Y.

(3) Since the purposes of this research aid require greater accuracy for the unit-cost index over the entire prewar period (1928-37) than for any individual year, let us assume that the real ratio (to be designated as K) is a constant; derive the unit-cost index (to be designated as I) on that assumption; and then test the resulting index independently to see how much injustice is done by assuming the constancy of K.

(4) The problem may be expressed as follows:

$$\triangle = \frac{KY}{I}; \text{ therefore, } I = \frac{KY}{\triangle}$$

K is valued as 72.53 percent (see (1), above). Since it is treated as a constant, its value is immaterial to a unit-cost series expressed as annual changes in cost and expressed as an index of a base year. The value of K affects only the absolute value of I for a given year. The critical issue is the constancy of K; this may be checked by use of a consistency test comparing the value of capital investments in the first two Five Year Plans, expressed in a constant prewar ruble base, to comparable series expressed in a postwar ruble base, as given by a Soviet source. If the ratio between the prewar ruble base and the postwar ruble base is identical for both prewar Five Year Plans, the assumption of constancy of K over the entire prewar period may be defended as not contributing to aggregate error. Employment of this test shows less than 5 percent aggregate error introduced by employment of a constant K* over the period.** This does not deny, however, that the assumption may introduce error in the index for a particular year. Within the context of this problem, however, stability over the entire period is considered more important than accuracy for individual years. Ideally, we would want both; yet an attempt logically to

* Two factors which could affect the constancy of K do not appear to create significant error: (1) differential rates in the first two Five Year Plans for capital stock retirement relative to total additions to capital stock and (2) accruals from the "socialization" of capital stock increasing the ratio of additions to capital stock over investment in the Second Five Year Plan (1933-37) relative to the First. The relative stability of K indicates either that there was no significant change in the rate of retirement or that there are compensating errors in the derivation of the index which offset effects of any possible significant change. The same reasoning applies to the effects of accruals from socialization; however, the capital stock data for the Second Five Year Plan specifically excluded transfers from the private agricultural sector to the socialist agricultural sector and quite possibly excluded such transfers for the nonagricultural sector. 8/ This fact sharply limits possible distortion from this cause.

** See Table 12, p. 27, below.

modify K for individual years only created instability in the index (in effect this was an attempt to change the constant K to a variable "R," but in the absence of sufficient evidence to establish the value of R, this only contributed to greater error in the index).

(5) Table 2* illustrates the employment of this method to obtain a unit-cost index for 1928-37.

(6) Index Series, 1924-30.

On the basis of official Soviet indexes, the years 1925-27 may be added to the unit-cost index and the years 1928 and 1929 corrected. The unit-cost index for these years is derived by combining the official index of costs for all construction with the official index of wholesale industrial prices. Weights used are as follows: construction costs, 2; wholesale industrial prices, 1 -- arbitrarily, in conformity with postwar ratios. Wholesale industrial price index is used as a measure of the movement of capital equipment prices throughout the period. See Table 3** for the necessary computations and the resultant index.

(7) Linking the Series.

The index derived in (6), above, is considered more reliable for the years 1928 and 1929 than the series derived in Table 2 for those years.*** Consequently, the entire series from Table 3 (1925-30) will be linked with the previous series, on the 1937 base. The results are shown in Table 4.****

(8) Index for 1940.

Several researchers have made valuable discoveries in connection with study of the so-called "1940 mystery." 9/ Kaplan's tentative calculations indicated a 10-percent increase in costs from 1936 "Planning Prices" to 1940 costs (35.3 billion 1940 rubles equals

* Table 2 follows on p. 13.
** Table 3 follows on p. 14.
*** It is probable that in the first years of the First Five Year Plan a relatively low percentage of total investment would be additions to capital stock, and this is the implication of the discrepancies between the two series relative to 1928 and 1929. This is resolved as explained.
**** Table 4 follows on p. 15.

Table 2

Derivation of Unit-Cost Index for Total State Capital Investment in the USSR
1928-37

Year	Investment (Y) a/ (Billion Current Rubles)	KY (K = 0.7253)	Addition to Capital Stock (Δ) b/ (Billion 1933 Rubles)	$\frac{KY}{\Delta}$ (1933 = 100)	I (1937 = 100)
1928	4.088	2.965	3.340	88.77	106.25
1929	5.805	4.210	5.255	80.11	95.88
1930	9.495	6.887	9.612	71.65	85.76
1931	15.116	10.964	12.660	86.60	103.65
1932	19.351	14.035	13.174	106.54	127.52
1933	18.1	13.128	13.128	100.00	119.69
1934	23.5	17.045	14.448	117.97	141.20
1935	27.2	19.728	21.304	92.60	110.83
1936	35.5	25.748	22.680	113.53	135.88
1937	33.2	24.080	28.820	83.55	100.00

a. Annual investments cited less collective farm investment, but including capital repair, as given in source 10/.
b. Annual addition to capital stock derived from data in source 11/, using the figure of 163.280 billion for 1 January 1937 and 192.100 billion for 1 January 1938.

Table 3

Derivation of Unit-Cost Index for Total State Capital Investment in the USSR
1924/25-1930

Year	Construction Costs		Wholesale Industrial Prices		Composite Index [a]	
	1913 = 100 [b]	1928/29 = 100	1913 = 100 [c]	1928/29 = 100	1928/29 = 100	1930 = 100 [d]
1924/25	226	98.3	179	95.5	97.4	101
1925						
1925/26	269	117.0	186	99.3	111.1	
1926						110
1926/27	257	111.7	196.2	104.7	109.4	
1927						108
1927/28	247	107.4	187.7	100.2	105.0	
1928						104
1928/29	230	100.0	187.4	100.0	100.0	
1929						100
1929/30		(100.0)		(100.0)	(100.0)	
1930						100

a. Construction index is double-weighted relative to index of wholesale industrial prices for derivation of this index.
b. 12/
c. 13/
d. Determined by linear interpolation from preceding column, assuming 1930 to equal 1929 index, as indicated by sources 12/ and 13/.

Approved For Release 1999/09/27 : CIA-RDP79S01046A000400030001-4

Table 4

Final Approximation of Unit-Cost Index
for Total State Capital Investment
in the USSR
1925-37

Year	1937 = 100
1925	86.62
1926	94.34
1927	92.62
1928	89.19
1929	85.76
1930	85.76
1931	103.65
1932	127.52
1933	119.69
1934	141.20
1935	110.83
1936	135.88
1937	100.00

an estimated 32 billion 1936 Planning Rubles). Nove's calculations indicate a 13-percent increase in costs for total investment (43 billion 1940 rubles equal 38 billion 1936 Planning Rubles). It is a thesis of this research aid that the 1937 cost level best represents the 1936 Planning Rubles level. On this assumption, and accepting an indicated increase of 13 percent for 1940 over 1937, the index for 1940 becomes 113.00.

(9) Linking the Prewar Series with the Postwar Series.

The linkage between 1936 estimate costs and 1945 estimate costs has been determined as follows: 1936 Estimate Cost equals 83.6 percent of 1945 Estimate Cost.* The 1936 estimate prices on construction-assembly expenditures were the prices in effect on 1 December 1936,

* This factor is derived from officially published conversion coefficients. 14/

and the estimate prices on equipment were the listed prices (preiskurantnyye) of 1937. 15/ A Soviet author states that prices of industrial goods were reduced in 1935 and in 1937; hence it will be assumed that the estimate prices reflect this as a planned reduction. 16/ This being the case, the best measure of the 1936 Estimate Cost will be the 1937 cost level.

The 1945 estimate prices are specifically those prevailing on 31 December 1945. 17/ Since there is no evidence of a price change at that time, the general price level of 1945 will be accepted as the best estimate.

(10) Consistency Checks on the Prewar Series.

Since a vital element in the checking of this series is a postwar price level, independently obtained, this check has been performed.* Indicated aggregate error for either the First or the Second Five Year Plan, or both combined, is plus or minus 5 percent. Higher error is possible for any individual year; therefore, the use of the index should be restricted primarily to sequential analysis over several years.

b. Postwar Index.

(1) Derivative Index, 1945-50.

A unit-cost index for 1945-50 may be derived from the comparison of annual centralized investment in current prices with the same series in constant 1945 prices. The series in 1945 prices may be derived in two ways: by application of announced percentage increases to a 1945 base or by algebraically solving an equation for the known total centralized investment over the period 1946-50 (see Table 5**). The source giving the percentage increases specifies that they pertain to the volume of centralized capital investment, relative to the preceding year. 18/ The requisite 1945 base is supplied by an official source citing 36.3 billion rubles as the amount of centralized investment financed in 1945. 19/ The total centralized investment figure is supplied by the statement that the 1946-50 plan of 250.3 billion rubles (1945 Planning Rubles) was overfulfilled by 22 percent -- "this means that actual investments were 306 billion rubles." 20/

* See Table 12, p. 27, below.
** Table 5 follows on p. 17.

Table 5

Centralized Capital Investment in the USSR
1945-50

Year	(1) Cumulated Percent Increase (1945 = 100)	(2) Derived Series (Billion 1945 Rubles)	(3) Algebraically Derived Series a/ (Billion 1945 Rubles)	(4) Volume Index b/ (1945 = 100)
1945	100	36.3	36.3	100
1946	117	42.5	43.3	119.3
1947	128.7	46.7	47.6	131.1
1948	158.3	57.5	58.5	161.2
1949	190.0	69.0	70.2	193.4
1950	233.7	84.8	86.4	238.0

a. Data for 1946-50 were determined from solution of the following equation:

$$x + 1.10x + 1.353x + 1.624x + 1.998x = 306, \text{ where } x = 1946 \text{ investment}$$

b. Derived from column (3).

Approved For Release 1999/09/27 : CIA-RDP79S01046A000400030001-4

The series in columns (2) and (3) are relatively consistent, with any differences explainable by rounding error or a remote possibility of a noncomparable price basis for the announced figure of 36.3 billion rubles in 1945. Because column (3) is a more internally consistent series, it will be accepted as the better estimate.

Despite some misgivings about the price basis of the 1945 figure, it is retained, and column (4) becomes the volume index of centralized investment for 1945-50, on a constant 1945 ruble basis.

A unit-cost index may now be obtained by division of the investment index in current rubles by the volume index in constant rubles (see Table 6*).

The methodology applied in Table 6 is not used for 1950, since Kaplan's estimate for 1950 is implicitly expressed in 1 January 1950 rubles and includes significant elements of investment not included in the volume index for centralized investment -- additions to the working capital of construction organizations and noncentralized investment. The cost-factor index for 1950 can be determined more accurately from the official conversion coefficients used in preparing 1950 cost estimates.

(2) Coefficient Index, 1936-50.

In 1947, 1949, and 1950 the USSR published a series of coefficients establishing the relationships between the estimate costs of 1936, 1945, 1949, January 1950, and July 1950. 21/ These coefficients were given for more than 50 ministries and major governmental components. Weighting each coefficient with the 1941 planned investment, three weighted average-cost-of-investment indexes have been obtained: construction-assembly, equipment, and total capital investment (see Table 7**). The weighted coverage is about 75 percent of the planned 1941 investment. Since there is little variation of the coefficients among the various ministries, use of the 1941 weights does not introduce extensive error.

The index for total capital investment was derived by weighting construction-assembly as 60 percent of total capital investment costs and equipment as 30 percent -- that is, 2 to 1. 22/

* Table 6 follows on p. 19.
** Table 7 follows on p. 20.

Table 6

Unit-Cost Index Obtained by Dividing Investment Index (Current Rubles) by Volume Index (Constant Rubles) 1945-49

Year	Centralized Capital Investment (Billion Current Rubles) a/	Index (Current Rubles)	Index (Constant Rubles)	Cost-Factor Index (1945 = 100)
1945	36.3	100	100	100
1946	44.2	121.8	119.3	102.1
1947	50.9	140.2	131.1	106.9
1948	66.2	182.4	161.2	113.2
1949	106.0	292.0	193.4	151.0

a. 23/

Approved For Release 1999/09/27 : CIA-RDP79S01046A000400030001-4

Table 7

Index of Estimate Costs for Total Capital Investment in the USSR
1936, 1945, 1949, January 1950, and July 1950

1945 = 100

	1936	1945	1949	January 1950	July 1950
Construction-assembly	81.4	100	160.9	140.1	132.1
Equipment	88.7	100	133.3	98.2	92.8
Total capital investment a/	83.6	100	152.1	126.9	119.6

a. Derived from unrounded data.

(3) Comparison and Analysis of the Derivative Index and the Coefficient Index.

The coefficient index supports the 1949 cost index of 151.0 indicated by the derivative index. It is also the best estimate of costs in January and July of 1950, relative to the base year.

In addition, the relationship between the estimate prices of 1936 and 1945 given by the coefficient index is the vital evidence in linking the prewar and postwar index series.* Table 8** gives the consolidated unit-cost index for capital investment in the USSR for 1945-50, with the 1936 Estimate Cost.***

(4) Unit-Cost Index, 1951-54.

In accordance with the theory propounded by Mr. Nove and supporting evidence that has been uncovered, it is now held that both the investment plan and the announced volume of capital investment are stated in July 1950 costs for the period 1951-54. In this case, the appropriate index for 1951-54 becomes 119.6 (1945 equals 100).

* See p. 25, below.
** Table 8 follows on p. 21.

Table 8

Consolidated Unit-Cost Index
for Capital Investment in the USSR
1936 Estimate Cost and 1945-50

	1945 = 100
1936 Estimate cost	83.6
1945	100.0
1946	102.1
1947	106.9
1948	113.2
1949	151.0
1950 (January)	126.9
1950 (July)	119.6

The savings to the firms resulting from the reduction of wholesale prices and tariffs in 1952 and the savings from successful cost reduction are expressed as additions to the own funds of enterprises -- that is, as contributions to the sum of investment -- and not as deductions from the aggregate scale of funds planned to be invested. Thus Chapnitskiy states that the economies from the January 1952 price cuts are calculated in the financial plans of the investing enterprises (rather than being deducted from the planned scale of investment) and that the sums of the planned reductions from estimate costs of construction and assembly effort are calculated in the balance of receipts and expenditures and directed to increasing the planned accumulation of contract construction organizations. 24/

In the budget message for 1953, Zverev announced the planned financing of capital investment, of which 15.5 billion rubles were to be financed by economies from reduction of wholesale prices and tariffs -- that is, the January 1952 cuts -- and from reduction of costs of construction-assembly work. 25/ This also confirms the conclusion that the scale of capital investment was planned in constant July 1950 prices.

As a matter of general interest, it is possible to derive an index for 1951-54 incorporating the effects of the price and cost reductions.*

* See p. 23, below.

(5) Additions to Working Capital, 1951-54.

An apparent obstacle to the thesis that the investment plans following 1950 are expressed in July 1950 costs is created by a noticeable understatement of fulfilled volume of capital construction relative to the announced plan figures. This can be resolved when it is recalled that the investment plan includes an allocation to increasing the working capital of construction organizations, a category not included in the fulfilled volume of capital construction series. Starting in 1950 or 1951, this category became significant in size, amounting perhaps to several billion rubles.

(6) Price Changes of January 1952.

The price changes of January 1952 appear to have reduced the costs of construction by 5 to 8 percent. An "example" given in a Soviet periodical indicated cost reduction in purely construction work on the order of 8 percent. 26/ On the other hand, there is evidence that, relative to aggregate capital investment, the reduction was 5 to 6 percent.

In 1952 the savings from the price cuts were added to the own funds of enterprises, as was the insignificant efficiency cost reduction of that year. A Soviet text indicates that in 1952 the contribution to investment from the own funds of enterprises increased by an amount equal to 5.7 percent of that year's capital investment. This would somewhat support the thesis that the price cuts amounted to 5 percent of total capital investment. 27/

(7) Achievement of Planned Cost Reductions, 1951-54.

The annual planned cost reductions have been on the order of 3 percent relative to the total capital investment program.* The Fifth Five Year Plan called for a reduction in the cost of construction of more than 20 percent. This is an average 4.5-percent reduction per annum. Since construction is two-thirds of the total cost of capital investment, these reductions average 3 percent relative to the total capital investment cost. 28/

* These were planned reductions in the cost of construction-assembly work stemming from increased efficiency of operation, reduction of overhead, and the like. They do not reflect unit-wage cost changes or changes in prices of materials.

In the absence of quantitative data, the following estimates represent subjective evaluation of the actual cost reductions achieved, expressed as a percentage of the total unit-cost of capital investment 29/:

1951 --	substantial fulfillment	(2½ percent reduction)
1952 --	slight reduction	(1 percent reduction)
1953 --	slight increase	(1 percent increase)
1954 --	slight reduction	(1½ percent reduction)

The final product of the analysis in this section and in (6), above, is shown in Table 9.

Table 9

Unit-Cost Index for Capital Investment in the USSR
Reflecting 1952 Price Cuts
and Fulfillment of the Plan for Cost Reduction
1950-54

	July 1950 = 100
1950 (July)	100
1951	97.5
1952	91.7
1953	92.6
1954	91.2

(8) Independent Check on Actual Cost Level, 1953.

The 1953 plan for capital investment stated that economies from the reduction of wholesale prices and costs of construction-assembly work were to consist of 15.5 billion rubles, relative to the plan for capital investment and growth in circulating capital in construction totalling 156.1 billion rubles. 30/ While the size of the assignments to circulating capital is unknown, it is not likely to be more than 10 billion rubles; hence planned capital investment was 146 billion to 156 billion rubles, with the anticipated reduction of expenditure from July 1950 costs amounting to 10 to 10.6 percent. According to the index of (7), above, a planned 3-percent

reduction on the 1952 index of 91.7 would have yielded a planned 11.1 percent reduction of expenditure,* comparing closely with the figure of 10 to 10.6 percent derived by this check (see Table 10). The range of error does not seem to be significant.

Table 10

Unit-Cost Index for Total State Capital Investment in the USSR 1950-54

1945 = 100

Year	Actual Index	Nominal Index Used in Plans and Fulfillment
1950 (January)	126.9	
1950 (July)	119.6	
1951	116.6	119.6
1952	109.7	119.6
1953	110.7	119.6
1954	109.1	119.6

c. Linking the Prewar and Postwar Indexes.

The entire index for 1925-54 on a 1945 base as given in Table 11** has been derived through statistical linking of the following series:

Year	Base	Reference
1925-37	1937 = 100	Table 4***
1940	1937 = 100	Appendix A, 2, a, (8)
1945-50	1945 = 100	Table 8****
1950-54	1945 = 100	Table 10

* From the cost level of July 1950.
** Table 11 follows on p. 25.
*** P. 15, above.
**** P. 21, above.

Section a, (9), above, explains why 1937 is selected as representing the 1936 Estimate Cost and the 1945 Estimate Cost. Accordingly, in linking the series, 1937 equals 83.6 (1945 equals 100).

Table 11

Unit-Cost Index for Capital Investment
in the USSR
1925-37, 1940, and 1945-54

1945 = 100

Year	Index	Year	Index
1925	72.4	1946	102.1
1926	78.9	1947	106.9
1927	77.4	1948	113.2
1928	74.6	1949	151.0
1929	71.7	1950 (January)	126.9
1930	71.7	1950 (July)	119.6
1931	86.7	1951 (Nominal)	119.6 a/
1932	106.6	1951 (Actual)	116.6
1933	100.1	1952 (Nominal)	119.6 a/
1934	118.0	1952 (Actual)	109.7
1935	92.7	1953 (Nominal)	119.6 a/
1936	113.6	1953 (Actual	110.7
1937	83.6	1954 (Nominal)	119.6 a/
1940	94.5	1954 (Actual)	109.1
1945	100.0		

a. The nominal index is that relevant to the annual investment plans and announced fulfillment.

d. Consistency Checks of the Index.

(1) A new and authoritative Soviet text has given data on total capital investment over the First, Second, and Fourth Five Year Plans, giving totals in constant rubles. This has provided an opportunity to test the index derived in this research aid. Differences in totals were as follows: First Five Year Plan, 1 percent; Second

Five Year Plan, 5 percent; and Fourth Five Year Plan, 3 percent. On the basis of this evidence, ranges of error are established as plus or minus 1 percent; plus or minus 5 percent; and plus or minus 3 percent, for the aggregate periods.

(2) The text lists the following investment totals, in "present prices": 1929-32, 68 billion rubles; 1933-37, 158 billion rubles; and 1946-53, 781 billion rubles. 31/ Analysis of the postwar investment figures, for which the unit-cost index was derived by the more rigorous methodology, indicates that the only acceptable hypothesis is that the price basis in the text is the estimate unit-costs of July 1950. Table 12* presents the detailed computations on the check. Totals in 1945 rubles have been converted to July 1950 rubles by the coefficient 1.196.

3. Unit-Cost Index for Industrial Capital Investment.

a. The methodology used in deriving the industrial capital investment series is largely that used for the total investment series. The use of identical sources and methodologies makes the two series directly comparable for analysis and interpretation.

b. Table 14** shows the calculations used in deriving the industrial investment index for 1928-37. In the presence of conflicting data, the industrial capital stock data for 1 January 1937 and 1 January 1938 have been checked against the ratios of industrial capital stock to total capital stock for the period 1928-36 (see Table 13***). On the basis of this check, adjusted stock figures have been used for the years 1927 and 1928. The derived figure for 1938 checks closely with the figure of 66,400 cited in Kaplan, based on an official source but relating to uncertain coverage.

c. On the basis of official Soviet indexes, the years 1925-27 may be added to the unit-cost index, and the years 1928 and 1929 corrected.**** The unit-cost index for these years is derived by combining the official index of costs for industrial construction with the official index of wholesale industrial prices.

---

* Table 12 follows on p. 27.
** Table 14 follows on p. 30.
*** Table 13 follows on p. 29.
**** It is probable that in the first years of the First Five Year Plan a relatively low percentage of total investment would be added to capital stock.

Table 12

Consistency Check on Unit-Cost Index for Capital Investment in the USSR 1929-37 and 1946-53 (Comparison of Investment Totals in July 1950 Rubles)

Billion Rubles

Year	Investment a/* (Current Rubles)	Cost-Factor Index (1945 = 100)	Investment (1945 Rubles)
1929	5.805	71.7	8.096
1930	9.495	71.7	13.243
1931	15.116	86.7	17.435
1932	19.351	106.6	18.153
		Total	56.927

Total investment in July 1950 rubles = 56.927 x 1.196 = 68.805
Soviet source gives figure for comparable period in same price basis b/ as 68 billion rubles.
Indicated range of error is plus or minus 1 percent for total period.

1933	18.1	100.1	18.1
1934	23.5	118.0	19.9
1935	27.2	92.7	29.3
1936	35.5	113.6	31.2
1937	33.2	83.6	39.7
		Total	138.2

Total investment in July 1950 rubles, 165.3
Soviet figure in July 1950 rubles, 158.0
Indicated range of error is plus or minus 5 percent for total period.

* Footnotes for Table 12 follow on p. 28.

Table 12

Consistency Check on Unit-Cost Index for Capital Investment in the USSR 1929-37 and 1946-53 (Comparison of Investment Totals in July 1950 Rubles) (Continued)

Billion Rubles

Year	Investment a/ (Current Rubles)	Cost-Factor Index (1945 = 100)	Investment (1945 Rubles)
1946	44.2	102.1	43.3
1947	50.9	106.9	47.6
1948	66.2	113.2	58.5
1949	106.0	151.0	70.2
1950	110.0 c/	119.6	92.0
1951	119.7 c/	119.6	100.1
1952	132.9 c/	119.6	111.1
1953	138.2 c/	119.6	115.6
		Total	638.4

Total investment in July 1950 rubles, 763.5
Soviet figure in July 1950 rubles, 781.0
Indicated range of error is plus or minus 3 percent for total period.

a. Includes capital repair for 1929-37; excludes it for 1946-53.
b. See p. 26, above.
c. 32/

Table 13

Ratio of Industrial Capital Stock to Total Capital Stock
in the USSR
1928-38

Year	(1) Total Capital Stock a/ (Million 1933 Rubles)	(2) Industrial Capital Stock b/ (Million 1933 Rubles)	(3) Column (2) / Column (1) (Percent)
1 January 1928	47,679	9,758	20.47
January 1929	51,019	11,296	22.14
January 1930	56,274	13,665	24.28
January 1931	65,886	17,639	26.77
January 1932	78,546	22,777	29.00
January 1933	91,720	28,559	31.14
January 1934	104,848	35,135	33.51
January 1935	119,296	40,921	34.30
January 1936	140,600	48,224	34.30
January 1937	163,280	(56,000) c/	(34.30)
January 1938	192,100	(66,000) c/	(34.30)

a. 33/
b. 34/
c. Derived by application of the ratio 34.30 to total capital stock figure for the year.

Table 14

Derivation of Unit-Cost Index for Industrial Capital Investment
in the USSR
1928-37

Year	Investment (Y) a/ (Billion Current Rubles)	Addition to Capital Stock (Δ) b/ (Billion 1933 Rubles)	Y/Δ	Unit-Cost Index	
				1937 = 100	1945 = 100
1928	1.880	1.538	1.222	81.4	67.2
1929	2.615	2.369	1.104	73.6	60.8
1930	4.114	3.974	1.035	69.0	57.0
1931	7.407	5.138	1.442	96.1	79.4
1932	10.431	5.782	1.804	120.2	99.3
1933	9.890	6.576	1.504	100.2	82.8
1934	11.868	5.786	2.051	136.6	112.8
1935	13.024	7.303	1.783	118.8	98.1
1936	15.969	7.776	2.054	136.8	113.0
1937	15.012	10.000	1.501	100.0	82.6

a. Including extra-limit investment and capital repair. Data from source 35/.
b. See b, above.

Approved For Release 1999/09/27 : CIA-RDP79S01046A000400030001-4

In composing the investment unit-cost index, construction costs are double-weighted relative to equipment costs, in arbitrary conformity with postwar ratios. The wholesale industrial price index is used as a measure of the movement of capital equipment prices throughout the period (see Table 15* for the necessary data and the resultant index).

d. Comparison of the industrial investment unit-cost index with that for total investment shows that, beginning in 1934, cost levels and subsequent movements in level become quite close in the two series. Inspection of the official coefficients** for interconversion of the estimate costs of 1936, 1945, 1949, and 1950 reveals that the two indexes (1945 = 100) are almost identical, as follows:

	1936	1945	1949	January 1950	July 1950
Industrial investment	82.6	100	152.0	125.9	118.8
Total investment	83.6	100	152.1	126.9	119.6

Based on this parallelism, the unit-cost index for total capital investment is used as the best estimate for the industrial investment index in 1937, 1940, and 1945-54. This expedient is required because of the absence of firm data for industrial investment in the postwar years.

e. The final consolidated index for industrial capital investment covering the years 1925-54 is shown in Table 16.***

f. The consistency check based on the Politicheskaya ekonomiya data has been made for 1929-32 and 1933-37.**** In making this check, the investment in current rubles is standardized to 1937 rubles by application of the unit-cost index. The 1937 rubles are converted to

* Table 15 follows on p. 32.

** See p. 18, above, concerning the methodology used in obtaining weighted average series from the data given in the source listed.

*** Table 16 follows on p. 33.

**** See p. 25, above, for an explanation of this methodology.

Table 15

Derivation of Unit-Cost Index for Industrial Capital Investment
in the USSR
1924/25-1930

Year	Index Components: Industrial Construction Cost Index [a] 1913 = 100	Index Components: Industrial Construction Cost Index [a] 1930 = 100	Index Components: Equipment Cost Index [b] (Wholesale Industrial Price Index) 1913 = 100	Index Components: Equipment Cost Index [b] (Wholesale Industrial Price Index) 1930 = 100	Composite Index [c] 1930 = 100	Composite Index [c] 1937 = 100	Composite Index [c] 1945 = 100
1924/25	218	99.5	179	95.4	98.1		
1925					102.4 [d]	70.7	58.4
1925/26	265	121.0	186	99.1	113.7		
1926					113.3 [d]	78.2	64.6
1926/27	254	116.0	196.2	104.5	112.2		
1927					110.9 [d]	76.5	63.2
1927/28	243	111.0	187.7	100.0	107.3		
1928					105.4 [d]	72.7	60.1
1928/29	219	100.0	187.7	100.0	100.0		
1929					100.0 [d]	69.0	57.0
1929/30	(219)	(100.0)	(187.7)	(100.0)	100.0		
1930					100.0 [d]	69.0	57.0

a. 36/
b. 37/
c. Derived by weighting as follows: construction cost index, 2; equipment cost index, 1. It is assumed that 1929 equalled the 1930 index, as indicated roughly by sources 36/ and 37/.
d. Derived by linear extrapolation from plan-year basis data.

Approved For Release 1999/09/27 : CIA-RDP79S01046A000400030001-4

Table 16

Consolidated Unit-Cost Index
for Industrial Capital Investment
in the USSR
1925-37, 1940, and 1945-54

Year	Index	Year	Index
1925	58.4	1940	94.5
1926	64.6	1945	100.0
1927	63.2	1946	102.1
1928	60.1	1947	107.0
1929	57.0	1948	113.2
1930	57.0	1949	151.0
1931	79.4	1950 (January)	126.9
1932	99.3	1950 (July)	119.6
1933	82.8	1951	119.6 a/
1934	112.8	1952	119.6 a/
1935	98.1	1953	119.6 a/
1936	113.0	1954	119.6 a/
1937	82.6		

a. Nominal index applicable to investment plan announcements and plan fulfillment reports. For approximation of actual cost movement during this period, see Table 10, p. 24, above.

July 1950 costs (those used in Politicheskaya ekonomiya) by application of the factor 1.438 (derived from the ratio 118.8/82.6, from d, above). This check is performed in Table 17.* Politicheskaya ekonomiya gives industrial investment for 1929-32 as 35.1 billion rubles and for 1933-37 as 82.8 billion rubles, probably in July 1950 costs.** 38/ This check indicates the range of error as plus or minus 7 percent for 1929-32 and plus or minus 3 percent for 1933-37.

* Table 17 follows on p. 34.
** See p. 26, above.

Table 17

Consistency Check on Unit-Cost Index for Industrial Capital Investment in the USSR
(Comparison of Investment Totals in July 1950 Rubles)
1929-37

Billion Rubles

Year	Investment a/ (Current Rubles)	Unit-Cost Index (1937 = 100)	Investment (1937 Rubles)
1929	2.615	69.0	3.790
1930	4.114	69.0	5.962
1931	7.407	96.1	7.708
1932	10.431	120.2	8.678
		Total	26.138
	Use of cost factor gives 37.586 billion July 1950 rubles (26.138 x 1.438)		
	Politicheskaya ekonomiya gives 35.1 billion July 1950 rubles		
	Indicated range of error is plus or minus 7 percent		
1933	9.890	100.2	9.870
1934	11.868	136.6	8.688
1935	13.024	118.8	10.963
1936	15.969	136.8	11.673
1937	15.012	100.0	15.012
		Total	56.206
	Use of cost factor gives 80.824 billion July 1950 rubles (56.206 x 1.438)		
	Politicheskaya ekonomiya gives 82.8 billion July 1950 rubles		
	Indicated range of error is plus or minus 3 percent		

a. Data from Table 14, p. 30, above.

4. Unit-Cost Index for Capital Investment in State Agriculture.

a. While the primary emphasis of this research aid has required indexes for total investment and industrial investment, available Soviet conversion coefficients make it readily possible to prepare an agricultural index for 1937, 1945, 1949, and 1950.

b. Index series as given by a Soviet source 39/ are shown in Table 18.

Table 18

Conversion Coefficients for Estimate Cost
Used in State Agricultural Investment Projects in the USSR
1936, 1945, 1949, January 1950, and July 1950

	1936 a/	1945	1949	January 1950	July 1950
Ministry of Agriculture					
Equipment	100	102	131	90	86
Construction-assembly	100 b/	117 b/	181	161	151
Ministry of State Farms					
Equipment	100	102	131	96	91
Construction-assembly	100 b/	117 b/	181	159	149

a. Cost level of the 1936 Estimate Cost is best represented by the 1937 cost level.
b. Averaged from range given in source.

c. An approximation has been made for agriculture in general (nonkolkhoz) by weighting the 2 ministries by their 1941 planned capital investment, and then combining the 2 indexes into a single composite index. The weights are 2.1 for the Ministry of Agriculture and 0.2 for the Ministry of State Farms, 40/ that is, approximately 10 to 1.

d. The two ministries have vastly different ratios of equipment to plant. This ratio is essential to construction of a composite capital investment unit-cost index and can be approximated from Soviet data for the mid-1930's 41/ as shown in Table 19.

Table 19

Ratio of Equipment to Plant in Soviet Agriculture

	Percent of Total Investment
State Farms and Cooperative Farms a/	
"Inventory" (equipment)	27
Nonresidence farm buildings	12.6
Ratio of equipment to plant = 2.14	
Machine Tractor Stations b/	
"Inventory" (equipment)	90.1
Nonresidence farm buildings	3.1
Ratio of equipment to plant = 29.1	
Collective Farms	
"Inventory" (equipment)	16.9
Nonresidence farm buildings	21.6
Ratio of equipment to plant = 0.78	

a. Ratio derived from these data is used as representative of the Ministry of State Farms.
b. Ratio derived from these data is used as representative of the Ministry of Agriculture.

e. Table 20* gives the derivation of the index series for agricultural (nonkolkhoz) investment and for kolkhoz investment (based on conversion coefficients for the state farms but weighted according to the lesser emphasis in the collective farms on equipment holdings). Investment in livestock and poultry is specifically excluded from the data used in deriving the series.

5. A Note on Other Relevant Indexes.

The derivation of a unit-cost index for capital construction, or of a related index, has been the purpose of several studies throughout the past several years. Several of these studies have contributed materially to this research aid. In addition, in recent months new Soviet data have become available, making it possible to set up consistency checks on the index, which was not possible previously.

For the prewar years, studies by Naum Jasny, M. Gardiner Clark, and Edward Ames have been especially valuable. Mr. Clark's index, an index of industrial construction costs derived primarily from official Soviet statistics, 42/ is in general agreement with the industrial investment index of this research aid. Differential cost movements for equipment (not included in Mr. Clark's index) can account for most of the differences between the two series.

Mr. Ames derived an index series for capital investment costs (including defense investment) by an analysis subject to sizable error but yet useful in establishing orders of magnitude. 43/ This index shows much less inflation during the period 1931-36 than does the index of the present research aid. In the absence of necessary data, it was not tested against independent checks.

Mr. Jasny's index for state capital investment shows a very high degree of inflation in the prewar years (as contrasted with Mr. Ames's index) continuing through 1949 -- considerably more than indicated in the index of the present research aid. 44/ The method used by Mr. Jasny in determining his index involved many points at which subjective judgments had to be made, and no tests of consistency were made on the completed index, which was actually a secondary product of his study. The danger in the use of Mr. Jasny's index is that of a pronounced understatement of the volume of investment in

* Table 20 follows on p. 38.

Table 20

Derivation of Unit-Cost Index for Agricultural Investment in the USSR a/*
1937, 1945, 1949, January 1950, and July 1950

	Weight	1937 (1936 Estimate Costs)	1945	1949	January 1950	July 1950
Ministry of Agriculture						
Equipment (1937 = 100)	29.0	100	102	131	90	86
Construction-assembly (1937 = 100)	1.0	100	117	181	161	151
Composite (1945 = 100)		98	100	130	90	86
Ministry of State Farms						
Equipment (1937 = 100)	2.0	100	102	131	96	91
Construction-assembly (1937 = 100)	1.0	100	117	181	159	149
Composite (1945 = 100)		93	100	138	109	103

* Footnotes for Table 20 follow on p. 39.

Approved For Release 1999/09/27 : CIA-RDP79S01046A000400030001-4

Table 20

Derivation of Unit-Cost Index for Agricultural Investment in the USSR a/
1937, 1945, 1949, January 1950, and July 1950
(Continued)

	Weight	1937 (1936 Estimate Costs)	1945	1949	January 1950	July 1950
Nonkolkhoz Agriculture b/						
(1945 = 100)		98	100	131	92	88
Kolkhoz investment c/						
Equipment (1937 = 100)	0.78	100	102	131	96	91
Construction-assembly (1937 = 100)	1.0	100	117	181	159	149
Composite (1945 = 100)		90	100	144	119	112

a. Excluding livestock and poultry.
b. This is a composite index derived by weighting as follows: Ministry of Agriculture, 10; Ministry of State Farms, 1.
c. Based on state farm conversion coefficients with kolkhoz weights.

constant cost terms. In historical perspective, however, Mr. Jasny's study is of great importance as a pioneer in the derivation of price and cost indexes.

In the postwar years, especially for 1945-50, derivation of an investment cost index from comparison of the investment fulfillment data (in constant rubles) with the estimated fulfillment of the investment plan (in current rubles) was developed by UN research groups, by A. Nove in Great Britain, and by Norman Kaplan of the RAND Corporation, working independently and each making a significant contribution. 45/ Some additional material has since become available which has been incorporated in the present research aid.

APPENDIX B

SOURCE REFERENCES

Evaluations, following the classification entry and designated "Eval.," have the following significance:

Source of Information	Information
Doc. - Documentary	1 - Confirmed by other sources
A - Completely reliable	2 - Probably true
B - Usually reliable	3 - Possibly true
C - Fairly reliable	4 - Doubtful
D - Not usually reliable	5 - Probably false
E - Not reliable	6 - Cannot be judged
F - Cannot be judged	

"Documentary" refers to original documents of foreign governments and organizations; copies or translations of such documents by a staff officer; or information extracted from such documents by a staff officer, all of which may carry the field evaluation "Documentary."

Evaluations not otherwise designated are those appearing on the cited document; those designated "RR" are by the author of this research aid. No "RR" evaluation is given when the author agrees with the evaluation on the cited document.

---

1. Politicheskaya ekonomiya, Moscow, Gospolitizdat, 1954. U. Eval. RR 2.
2. Knyaz'kov, G. "Kapital'noye stroitel'stvo v tyazheloy promyshlennosti za pervyy pyatiletniy plan" (Capital Construction in Heavy Industry in the First Five Year Plan), Planovoye khozyaystvo, no 1/2, 1933, p. 50 ff. U. Eval. RR 1.

3. USSR, Gosplan. Narodno-khozyaystvennyy plan na 1935 god (National Economic Plan for 1935), Moscow, 1935, p. 301-302. U. Eval. RR 1.
RAND Corporation. RM-735, Capital Investments in the Soviet Union, 1924-1951, 28 Nov 51, p. 101. U. Eval. RR 2.
4. Bergson, Abram. Soviet National Income and Product in 1937, New York, 1953, p. 118. U. Eval. RR 2.
5. USSR, Gosplan. Slovar'-spravochnik po sotsial'no-ekonomicheskoy statistike (Dictionary Handbook for Social and Economic Statistics), Moscow, Gosplanizdat, 1948, p. 360-361. U. Eval. RR 1.
6. Ibid.
7. Gozulov, A.I. Ekonomicheskaya statistika, Moscow, Gosfinizdat, 1953, p. 312. U. Eval. RR 1.
8. RAND Corporation. P-277, Soviet Capital Formation and Industrialization, by Norman Kaplan, 24 Oct 52, rev, Appendix, Table I, U. Eval. RR 2.
9. RAND Corporation. RM-735, op. cit. (3, above), p. 122, 129 ff. U. Eval. RR 2.

25X1C [redacted]

10. RAND Corporation. RM-735, op. cit. (3, above), Table XIII, p. 211. U. Eval. RR 2.
11. RAND Corporation. P-277, op. cit. (8, above).
12. State, OIR, External Research Staff. Some Economic Problems of the Iron and Steel Industry in the USSR, by M. Gardiner Clark, 1952, p. 5-7. U. Eval. RR 1. (citing I.G. Trotskiy, Stroitel'naya promyshlennost', no 11, 1934, p. 23)

25X1A

13. [redacted]
Soviet Union Information Bureau. Commercial Handbook of the USSR, Washington, 1929, p. 37. U. Eval. RR 1.
14. USSR, Ministry of Construction of Heavy Industry Enterprises. Sbornik rukovodyashchikh materialov i konsultatsiy po stroitel'stvo (Handbook of Directions and Advice for Construction), no 6, 1950, p. 27-29; no 9, 1950, p. 7-8; no 8, 1949, p. 26; and no 8, 1947, p. 15-16. U. Eval. RR 1.
15. USSR, Gosplan. Slovar'-spravochnik, op. cit. (5, above).
16. Mayzenberg, A. Tsenoobrazovaniye v narodnogo khozyaystvo SSSR (Price Formation in the National Economy of the USSR), Gospolitizdat, 1953, p. 45. U. Eval. RR 1.

17. USSR, Gosplan. Slovar'-spravochnik, op. cit. (5, above).
18. Gur'yevich, S. "Vypolneniye stroitel'nogo programmy pervoy poslevoyennoy pyatiletki" (Fulfillment of the Construction Program of the First Postwar Five Year Plan), Vestnik statistiki, no 3, 1951, p. 34 ff. U. Eval. RR 2.
19. Zasedaniya verkhovnogo soveta SSSR (Proceedings of the Supreme Soviet of the USSR), 2d sess, Moscow, 1946, p. 16. U. Eval. RR 1.
20. Plotnikov, K. "Sovetskiy byudzhet v gody pyatoy pyatiletki" (Soviet Budget in the Years of the Fifth Five Year Plan), Voprosy ekonomiki, no 6, 1954, p. 10. U. Eval. RR 1.
21. USSR, Ministry of Construction of Heavy Industry Enterprises, op. cit. (14, above).
22. Planovoye khozyaystvo, no 4, 1951. U.
Ivanov, P.S. Planirovaniye kapital'nykh rabot (Planning Capital Work), Moscow, Gospolitizdat, 1953, p. 30. U. Eval. RR 2.
23. Kaplan, Norman. Unpublished study, 1954. U. Eval. RR 2.
24. Chapnitskiy, L.A. Uchet i kal'kulirovaniye stoimosti stroitel'nogo proizvodstva (Accounting and Calculation of Construction Activity), Moscow, 1952, p. 144-145. U. Eval. RR 1.
25. Izvestiya, 6 Aug 53. U. Eval. RR 1.
26. Vinogradov, K. "Vyyavlyat' i ispol'zovat' rezervy snizheniya stoimosti stroitel'stva" (To Expand and Utilize Reserves in the Reduction of Construction Costs), Vestnik statistiki, no 5, 1953, p. 30 ff. U. Eval. RR 1.
27. Birman, A.M. Finansy otrasley narodnogo khozyaystvo SSSR (Finances of the Branches of the National Economy of the USSR), Part I, Moscow, Gosfinizdat, 1953, p. 198. U. Eval. RR 1.
28. CIA. CIA/RR CSM 201, Soviet Fifth Five Year Investment Plan, 29 Oct 54. C.
29. Ibid.
30. Izvestiya, 6 Aug 53. U. Eval. RR 1.
31. Politicheskaya ekonomiya, Moscow, Gospolitizdat, 1954, p. 344 and 551. U. Eval. RR 2.
32. CIA. Project 10.409, Capital Investment in the USSR, to be published. S.
33. RAND Corporation, P-277, op. cit. (8, above).
34. Ibid.

35. RAND Corporation. RM-735, op. cit. (3, above). p. 52. U. Eval. RR 2.
36. State, OIR, External Research Staff, op. cit. (12, above).
37. State, Moscow. Dsp 27, 29 Aug 45. C. Eval. RR 1.
Soviet Union Information Bureau, op. cit. (13, above).
38. Politicheskaya ekonomiya, Moscow, Gospolitizdat, 1954, p. 344 and 551. U. Eval. RR 2.
39. USSR, Ministry of Construction of Heavy Industry Enterprises, op. cit. (14, above).
40. USSR, Gosplan. Gosudarstvennyy plan razvitiya narodnogo khozyaystva SSSR na 1941 g (State Plan for the Development of the National Economy of the USSR in 1941), /Moscow, 1941/, p. 484. U. Eval. RR 1.
41. USSR, Gosplan. Socialist Construction in the USSR, Moscow, Soyuzorgouchet, 1936, p. 243-245. U. Eval. RR 1.
42. State, OIR, External Research Staff, op. cit. (12, above).
43. [redacted]
44. Jasny, Naum. Soviet Prices of Producers' Goods, Stanford, 1952, p. 20, 141, and 165. U.
45. UN, ECE. Economic Survey of Europe, 1951, Geneva. U. Eval. RR 3.
Nove, A. "A Note on the Volume of Soviet Investment," The Review of Economics and Statistics, vol XXXVI, no 1, Feb 54, p. 74 ff. U. Eval. RR 2.
RAND Corporation. RM-735, op. cit. (3, above), p. 121. U. Eval. RR 2.

25X1A

OFFICE OF RESEARCH AND REPORTS

Projects Control Staff

Control Sheet

CONFIDENTIAL

Classification

Series Number CIA/RR RA-2

Number of Copies 152

Date of Document 18 Nov 55

Copy No.	Recipient	Date	Returned
1	AD/RR	16 Nov 55	
2, 112	St/PC file copies	17 Nov 55	
25X1C 113 - 116	[redacted]		
117			
118, 119			
120 - 122			
123			
124			
125			
126			
127	Extra filed in St/PC	18 Nov 55	
112	M/AG	2 Nov. 55	
89	ret'd from Ch/C	23 Nov. 55	
25X1A9a 3	ret'd from Ch/C	23 Dec. 55	
89	[redacted] D/E	1 Dec. 55	ret'd 4 Jan 56
25X1A9a 127	on loan to [redacted] MIP	8 Dec. 55	
93	25X1A9a to [redacted] IR	4 Jan. 56	
89	[redacted] I/MM	10 Jan. 56	
25X1A9a 76	from Records to [redacted]	24 Jan. 56	
129	RC → [redacted] LDICR	6 Mar 56	
25X1A9a 130-1	RC → [redacted] M	9 Mar 56	
25X1A9a 133	RC → LDICR for [redacted] AFOIN	22 Mar 56	
106	rec'd from records	30 July 56	
65	" " "	" " "	
25X1A9a 106	[redacted]	15-15-m 30 July 56	25X1A9a
25X1A9a 65	[redacted] 15-R-m	30 July 56	
134	rec'd from R.C. and sent to I/mm	14 Aug 56	
25X1A9a 2	on loan to [redacted] I/TH	1/23/57	
25X1A9a 1	on loan to [redacted] S/CST	7 Feb 57	
135	from Records Center	12 Feb 57	
56	ret'd from D/E	10 Apr 57	
56	Records Center	19 July 58	